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ABSTRACT

One pathway through which second order effects proceed is "social referencing," a process in which the individual utilizes another's interpretation when appraising a situation. This phenomenon is well identified in adults and older children. While it had not been studied in infancy, there are good indications that the necessary cognitive and social skills for social referencing emerge in the second half of the first year. In the present study, 87 ten-month-old boys and girls received nonverbally positive and neutral messages about a stranger from their mothers, either directly when she communicated to the infant or indirectly when the infant observed her speaking to the stranger. Overall, the more positive the mother's message, the more friendly the infant's behavior to the stranger. This effect was very strong when the message was provided directly to infants of easy temperament. The evidence suggests that infants' evaluations of the stranger, which led to differences in behavior to the stranger, were influenced by the mother's message. (Author/MP)

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Social Referencing and Second Order Effects in Ten-Month-Old Infants

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Abstract

One pathway through which second order effects proceed is through social referencing, a process in which the individual utilizes another's interpretations when appraising a situation. This phenomenon is well identified in adults and older children. While it had not been studied in infancy, there are good indications that the necessary cognitive and social skills for social referencing emerge in the second half of the first year. Eighty-seven ten-month-old boys and girls received nonverbally positive and neutral messages about the stranger from their mothers either directly when she communicated to the infant, or indirectly when the infant observed her speaking to the stranger. Overall, the more positive the mother's message, the more friendly the infant's behavior to the stranger. This effect was very strong when the message was provided directly to infants of easy temperament. The evidence suggests that infant's evaluations of the stranger were influenced by the mother's message, which led to differences in behavior to the stranger.

It is obvious that the essential building blocks of human sociality are dyadic relationships. It is equally apparent that since dyads are located within social contexts, they are susceptible to what Bronfenbrenner (1974) has called "second order effects" -- the influence that a third person has upon the interaction of two others. Recent research in infancy has found ample evidence of such second order effects. As the investigations of Clarke-Stewart (1978), Lamb (1977, 1978), and Parke (Parke, 1979; Parke & O'Leary, 1976) have noted, the presence, stimulation, and support of a third person influences the infant's interaction within a dyad. With regard to the interaction of infants with strangers, which is the specific focus of this paper, the implicit protection provided by the proximity of a caregiver enhances the friendliness of the infant's response to the stranger (Campos, Emde, Gaensbauer, & Henderson, 1975; Feinman, 1980; Morgan & Ricciuti, 1969).

The caregiver can have a further second order effect by influencing the infant's interpretation of the stranger. The infant's glances towards the caregiver may be met with cues which aid in defining the nature of the unfamiliar adult. This social influence process -- long recognized in older humans -- can be called social referencing, and we believe that it occurs within the first year of life. The study reported here concerns the influence of the mother's nonverbal affect upon the 10-month-old's evaluation of and behavior to an unfamiliar adult.

Social Referencing

Social referencing is the request, receipt, and use of other persons' interpretations of the situation to form one's own understanding of that

situation. Individuals often refer to other persons' definitions of events, and incorporate these interpretations into their own evaluations. Social referencing requires: 1) that behavioral response be based upon the interpretation of the stimulus, and not just upon its inherent qualities, and 2) that such constructivist activity be influenced by others' interpretations. To put it simply, action must be based upon socially constructed reality.

Social referencing can have purely imitative consequences, or it can have a wider range of behavioral outcomes. In other words, modification of the individual's evaluation of a stimulus need not lead to only the behavioral cues emitted by the other person which led to this modification. Furthermore, one can acquire social referencing information either through direct transmission, or through inference of the other's interpretation by observation of that person's response to the situation -- in other words, it can be directly or indirectly conveyed. Social referencing through the inference of interpretation from action is the more cognitively complex of these two pathways, and is likely to develop at a later time in the lifespan than sensitivity to the direct transmission of definitional cues.

The social referencing process underlies much of the thought and behavior of adults and older children. It is the hallmark of a multitude of social psychological and microsociological theories such as those of social comparison (Festinger, 1954), the affiliative tendency (Schachter, 1959), conformity and obedience (Asch, 1951; Milgram, 1974), and the symbolic interactionist theory of the looking-glass self (Cooley, 1902; Mead, 1934). For example, the sociologist Howard Becker reported that

the user's experience of "getting high" from smoking marijuana was not simply a function of physiological sensation, but of the receipt of messages from more experienced smokers identifying these sensations as a "high" and defining the feeling as a pleasant one (Becker, 1953). In other words, an individual's experience of a psychotropic drug is socially constructed. Children's inclination to imitate the behavior of a model is another case in point. Since behavior implicitly indicates the model's definition of the situation, the child can attribute definition from action, incorporate that interpretation into her or his own evaluation, and then act upon it. Social referencing is a major pathway towards determining how to feel and what to do in a situation.

Social Referencing in Infancy

Recently, it has been suggested that social referencing occurs in infancy (Campos & Stenberg, in press; Feinman, 1980). Although investigations that focus directly on this phenomenon have only recently begun -- as in our work and that of Campos and his colleagues -- there are good indications from other research that the social construction of reality emerges in the second half-year of life.

In the early months, response to events is often a function of the interaction of stimuli with internal structures, primarily in terms of familiarity and the fit of these stimuli into schema (Cohen, DeLoache, & Strauss, 1979; Eimas, 1975). Clearly, assimilation and accommodation are constructivist activities. Around eight months, infants begin to evaluate stimuli as well, as if judging their likely consequences, and then basing action upon such appraisal (Sroufe, Waters, & Matas, 1974).

The construction of reality thus becomes not just a process of discrimination, but also one of interpretation of meaning and consequence. Schaffer and his colleagues (Schaffer, Greenwood, & Parry, 1972) have noted that although infants younger than nine months discriminate visually between familiar and unfamiliar objects, they reach for both with equal speed. However, after nine months, reaching for the unfamiliar object is delayed, suggesting that action has come to be based upon appraisal.

There also are indications that by this age reality construction is socially influenced. Considerable debate has been raised over the occurrence of early imitation, and even if infants do repeat a model's behavior in the first few months, the social referencing contribution of such activity would be minimal (Jacobson, 1979; Lewis, 1979; Meltzoff & Moore, 1977; Uzgiris, in press). While social referencing is selective, early imitation is not (Jacobson & Kagan, 1978; Lewis, 1979). Social referencing allows for the learning of new interpretations, but early imitation occurs with respect to familiar behaviors. Furthermore, while social referencing is a truly social process, early imitation may occur because the infant believes the model's behavior to be its own, and repeats it as a form of functional assimilation (Piaget, 1962). Although there is some similarity in the products of social referencing and early imitation, there is a large gap between the processes upon which each is based.

Between six and twelve months, there are indications that the skills needed for social referencing, and the inclination to perform it are emerging. First, infants often look towards caregivers when encountering a new toy or person (Bretherton, 1978; S. Carr, Dabbs, & T. Carr, 1975;

Feinman, 1980; Gunnar, 1980; Haviland & Lewis, 1975; Rheingold & Eckerman, 1973) which could serve to request and receive cues about the stimulus. Second, infants begin to imitate unfamiliar behaviors as well as familiar ones with regard to object selection and manipulation (Eckerman & Whatley, 1977; Eckerman, Whatley, & McGhee, 1979; Kaye, 1971). Third, infants can distinguish among and react appropriately to emotional expressions after the age of six months (Charlesworth & Kreutzer, 1973). Since social referencing relies heavily on the use of affective cues to infer another person's interpretation, the emergence of sensitivity to emotion is a significant development.

Until recently, there have not been any investigations focused directly upon social referencing in infancy. The study presented here considered the degree to which the mother could modify the infant's evaluation of and behavior to the stranger by providing the infant with a "message" about the stranger.

In the study, 87 ten-month-olds -- 46 girls and 41 boys -- received nonverbally positive or neutral messages about an unfamiliar adult from their mothers.[1] The message was conveyed either directly to the infant, or indirectly when the infant observed the mother speaking to the stranger. The social referencing hypothesis suggests that the more positive the mother's nonverbal affect, the more friendly the infant will be to the stranger. Social referencing was expected to be more pronounced when the mother communicated directly to the infant, and when the infant was of easy temperament.

Methods

At the onset of the experimental session, the infant was seated in a highchair, and the mother sat to the infant's right. The chair in which the stranger would sit was on the infant's left. The door through which the stranger entered faced the infant. Four tape marks were placed on the floor to indicate to the stranger where to stop during the approach.

There were four segments in the session, but this analysis concerns the first two: the stranger approach and the nonintrusive phase. In the approach, the stranger entered the room, and in sequence, walked and stopped for five seconds at each mark. The mother provided a message each time the stranger paused. After standing at the fourth mark -- which was located in front of the empty chair -- the stranger sat down, initiating the nonintrusive phase, and looked through a magazine for the next minute. The mother gave her infant a toy but did not interact with either infant or stranger. Data analysis asked whether the infant's behavior to the stranger during the nonintrusive phase reflected social referencing of the mother's message.

In the control condition, the mother did not speak during the approach. The direct influence conditions called for mothers to speak to their infants in either a positive or neutral tone about the stranger. In the indirect influence conditions, they spoke to the stranger in either a positive or neutral voice tone. Thus, nonverbal affect -- positive or neutral -- and direction of communication -- to the infant or to the stranger -- were varied in the experimental design.

Mothers' responses to Carey & McDevitt's (1978) Infant Temperament Scale were used to classify infants as easy or as difficult. The former consisted of Carey & McDevitt's easy and intermediate low classifications, and the latter consisted of intermediate high, difficult, and slow-to-warm-up infants. Slightly less than half of the infants -- 49% -- were in the easy temperament group.

For coding purposes, the one-minute nonintrusive phase was divided into four 15-second segments. In each period, coding was performed for infants' behavior from which the dependent variables were derived. Inter-coder agreement, based on the judgements of one coder who considered all 87 cases, and a second coder who viewed 45 cases, was 90% or higher for all measures. Details concerning coding are presented in an appendix. Each variable indicated the number of 15-second periods -- ranging from 0 to 4 -- in which the infant performed the following behaviors: smiling to the mother, smiling to the stranger, offering the toy to the stranger, offering the toy to the mother, being in proximity to the stranger, and being in proximity to the mother. It will be apparent later why behaviors to the mother as well as to the stranger were coded in order to select between social referencing and an alternative explanation.

Nonverbal affective quality and length of the mother's messages were coded in the noncontrol conditions (N=70) in order to: 1) evaluate the manipulation of the positive and neutral affect conditions, 2) determine whether affect and length of message were correlated, and 3) obtain a finer measure of the mother's affect. Length was measured by the number of words expressed in each of the four communications during the approach.[2]

The correlation between a coder who viewed all 70 cases and another who considered 35 cases was .99 (df = 33, $p < .01$). Affect was coded on a scale from -8 (extremely negative) to +8 (extremely positive) for each of the four messages with an intercoder correlation of .95 (df = 68, $p < .01$).

Although affect was more positive in the positive than the neutral conditions ($F(1, 62) = 163.24$, $p < .01$), the two distributions did overlap. Furthermore, mothers spoke more positively to their infants than to the stranger ($F(1, 62) = 25.47$, $p < .01$). Most important, affect and quantity of mother's communication were correlated -- .44 -- so that use of the assigned conditions as the independent variable would have presented serious statistical problems. Instead, the sum of the affect ratings of the mother's four messages during the approach was utilized. The Pearson correlations between mother's affect during the approach and each infant behavior during the one-minute period, with the effect of quantity of communication partialled out were calculated for all 70 noncontrol subjects as a group, and for each Direction of Communication by Infant Temperament subgroup.[3] Since the 17 mothers in the control condition did not speak, and therefore, their affect could not be rated, the use of the coded affect ratings reduced the sample for data analysis from 87 to 70 infants.

Results and Discussion

The social referencing hypothesis suggests that the infant will interpret the mother's nonverbal affect as information about the stranger, and will integrate this message into its own evaluation of the stranger,

influencing subsequent behavior to the stranger. It is predicted that the more positive the mother's affect, the more the infant will move closer to, smile at, and offer the toy to the stranger. As one can see in Table 1, the moderate size of these correlations -- .27, .25, and .20 respectively -- for all 70 infants, suggests that this indeed is the case. As can be seen in the next column, the correlations of .78, .68, and .50 between mother's affect and proximity, smiling, and toy offers to the stranger indicate that social referencing is especially powerful when the mother talked directly to easy temperament infants, as was expected prior to data collection, In contrast, of the nine correlations with regard to behavior to the stranger in the other three groups, only one was significantly greater than zero.

An alternative explanation for the correlations between mother's affect and infant behavior to the stranger is that the mother's message modifies the infant's mood, which, in turn, modifies behavior to the stranger. The more positive the mother's affect, the more favorable the mood, and therefore, the more friendly the behavior to the stranger. There still would be a second order effect, but not due to a modification of the infant's evaluation of the stranger.

The statistical distinction between social referencing and mood modification can be made by consideration of the correlations of affect with infant behavior to the mother. In the mood modification hypothesis, behavior to the mother as well as to the stranger should be positively correlated with mother's affect. On the other hand, if the infant has indeed engaged in social referencing, then the mother's affect during the

approach will have been used by the infant specifically as information about the stranger. While there would be a positive correlation of mother's affect with behavior to the stranger, no such correlation would be found with regard to the infant's behavior to the mother. The correlations of mother's affect with infant behavior to the mother were not significantly greater than zero, both for the whole group of infants and for each subgroup.[4] It would seem therefore, that social referencing does occur, and that it is powerful when the mother communicates directly to infants of easy temperament.

While earlier studies had found that infants look to their caregivers when they meet an unfamiliar person (Feinman, 1980; Bretherton, 1978: Rheingold & Eckerman, 1973), the common practice of asking the caregiver not to converse with infant or stranger prevented infants from displaying their social referencing skill. When caregivers <u>are</u> asked to provide information about the stranger, a second order effect occurs in that 10-month-olds of easy temperament are strongly influenced by the message when it is provided directly.

Inasmuch as they have difficulty interpreting cues not expressed directly to them, and can utilize only nonverbal cues, the infant in the second half-year does not appear to be anywhere as sophisticated as older humans at social referencing. Nonetheless, the basic social referencing process influences infants and older humans in basically the same manner. In addition to the second order effects due to the presence and protection of a caregiver when an infant meets a stranger, the caregiver can also serve a social construction of reality function by influencing the infants' appraisal of the stranger.

References

Asch, S. E. Effects of group pressure on the modification and distortion of judgements. In H. Geutzkow (Ed.), Groups, leadership, and men. Pittsburgh: Carnegie, 1951.

Becker, H. S. Becoming a marijuana user. American Journal of Sociology, 1953, 59, 235-242.

Bretherton, I. Making friends with one-year-olds: An experimental study of infant-stranger interaction. Merrill-Palmer Quarterly, 1978, 24, 29-51.

Bronfenbrenner, U. Developmental research, public policy, and the ecology of childhood. Child Development, 1974, 45, 1-5.

Campos, J. J., Emde, R. N., Gaensbauer, T., & Henderson, C. Cardiac and behavioral interrelationships in the reactions of infants to strangers. Developmental Psychology, 1975, 11, 589-601.

Campos, J. J., & Stenberg, C. Perception, appraisal, and emotion: The onset of social referencing. In M. Lamb & L. Sherrod (Eds.), Infant social cognition. Hillsdale, N.J.: Lawrence Erlbaum Associates, in press.

Carey, W. B., & McDevitt, S. C. Revision of the Infant Temperament Questionnaire. Peadiatrics, 1978, 61, 735-739.

Carr, S., Dabbs, J., & Carr, T. Mother-infant attachment: The importance of the mother's visual field. Child Development, 1975, 46, 331-338.

Charlesworth, W. R., & Kreutzer, M. A. Facial expressions of infants and children. In P. Ekman (Ed.), Darwin and facial expression. New York: Academic, 1973.

Clarke-Stewart, K. A. And daddy makes three: The father's impact on mother and young child. Child Development, 1978, 49, 466-478.

Cohen, L. B., DeLoache, J. S., & Strauss, M. S. Infant visual perception. In J. D. Osofsky (Ed.), Handbook of infant development. New York: Wiley, 1979.

Cooley, C. H. Human nature and the social order. New York: Schocken, 1964 (Originally published, 1902).

Eckerman, C. O., & Whatley, J. L. Toys and social interaction between infant peers. Child Development, 1977, 48, 1645-1656.

Eckerman, C. O., Whatley, J. L., & McGhee, L. J. Approaching and contacting the object another manipulates: A social skill of the 1 year old. Developmental Psychology, 1979, 15, 585-593.

Eimas, P. D. Speech perception in early infancy. In L. B. Cohen & P. K. Salapatek (Eds.), Infant Perception: From sensation to cognition. Perception of space, speech, and sound, Vol. 2. New York: Academic, 1975.

Feinman, S. Infant response to race, size, proximity, and movement of strangers. Infant Behavior and Development, 1980, 3, 187-204.

Festinger, L. A theory of social comparison processes. Human Relations, 1954, 7, 17-40.

Gunnar, M. R. Control, warning signals, and distress in infancy. Developmental Psychology, 1980, 16, 281-289.

Haviland, J., & Lewis, M. Infants' greeting patterns to strangers. Paper presented at the Human Ethology session of the Animal Behavior Society Meeting, Wilmington, N. C., 1975.

Jacobson, S. W. Matching behavior in the young infant. Child Development, 1979, 50, 425-430.

Jacobson, S. W., & Kagan, J. Release response in early infancy: Evidence contradicting selective imitation. Paper presented at the International Conference on Infant Studies, Providence, R. I., 1978.

Kaye, K. Learning by imitation in infants and young children. Paper presented at the Biennial Meeting of the Society for Research in Child Development, Minneapolis, MN, 1971.

Lamb, M. E. The development of mother-infant and father-infant attachments in the second year of life. Developmental Psychology, 1977, 13, 637-648.

Lamb, M. E. Infant social cognition and "second order" effects. Infant Behavior and Development, 1978, 1, 1-10.

Lewis, M. Issues in the study of imitation. Paper presented at the Biennial Meeting of the Society for Research in Child Development, San Francisco, Calif., 1979.

Mead, G. H. Mind, self, and society. Chicago: University of Chicago Press, 1934.

Meltzoff, A. N., & Moore, M. K. Imitation of facial and manual gestures by human neonates. Science, 1977, 198 (4312), 75-78.

Milgram, S. Obedience to authority. New York: Harper & Row, 1974.

Morgan, G. A., & Ricciuti, H. N. Infants' responses to strangers during the first year. In B. M. Foss (Ed,), Determinants of infant behavior IV. London: Methuen, 1969.

Parke, R. D. Perspectives on father-infant interaction. In J. D. Osofsky (Ed.), Handbook of infant development. New York: Wiley, 1979.

Parke, R. D., & O'Leary, S. E. Father-mother-infant interaction in the newborn period: Some findings, some observations and some unresolved issues. In K. Riegel & J. Meacham (Eds.), The developing individual in a changing world, Vol. II, Social and environmental issues. The Hague: Mouton, 1976.

Piaget, J. Play, dreams, and imitation in childhood. New York: Norton, 1962.

Rheingold, H. L., & Eckerman, C. O. Fear of the stranger: A critical review. In H. W. Reese (Ed.), Advances in child development and behavior. Vol. 8. New York: Academic, 1973.

Schachter, S. The psychology of affiliation. Stanford: Stanford University Press, 1959.

Schaffer, H. R., Greenwood, A., & Parry, M. H. The onset of wariness. Child Development, 1972, 43, 165-175.

Sroufe, L. A., Waters, E., & Matas, L. Contextual determinants of infant affective response. In M. Lewis & L. A. Rosenblum (Eds.), The origins of fear. New York: Wiley, 1974.

Uzgiris, I. C. Two functions of imitation during infancy. International Journal of Behavioral Development, in press.

Footnotes

1. Of the 87 infants, two participated with their fathers. Both fathers were primary caregivers, and one quite insistent that he, rather than his wife, accompany their infant to the laboratory. Since 98% of the subjects did participate with their mothers, the term "mother" will be used throughout this paper.
2. Length was also measured by the number of syllables expressed in each of the four communications during the approach. Intercoder correlation was .99 ($df = 33$, $p < .01$), and the syllable measure correlated very highly ($r(68) = .99$, $p < .01$) with the number of words. The numbers of words measure was used in data analysis since it possessed clearer natural meaning.
3. Since all six dependent variables had positively skewed distributions, the correlations were also calculated using a $\log_{10} (x + 1)$ transformation for the infant behavior measures. The coefficients did not differ much from those which utilized the raw frequency data, and the results were unchanged.
4. The .32 correlation with smiles to the mother in the condition which involved direct communication to easy infants was not significant, but deserves some mention. The absence of similar effects for proximity and toy offer to the mother suggest that when infants were enjoying contact with the stranger, they would communicate their pleasure to the mother through smiling.

Table 1

Correlation of Affect of Mother's Communication with Infant's Behavior, Partialling Out Quantity of Mother's Communication

Behavior	Direction by Temperament Condition			
	Infant Easy	Infant Difficult	Stranger Easy	Stranger Difficult
	All Ss N=70	N=17	N=18	N=18	N=17
Proximity					
Move to:					
Stranger	.27**	.78***	-.12	.03	-.12
Mother	.11	-.03	.50**	-.12	.07
Facial Expression					
Smile to:					
Stranger	.25**	.68***	.39*	-.27	.16
Mother	.00	.32	.10	-.36*	-.36*
Toy Offers					
Offer to:					
Stranger	.20**	.50**	.10	.01	.06
Mother	-.26**	-.35*	-.24	-.07	-.35*

*.10
**.05
***.01

Appendix

Several dimensions of videotaped infant response were coded for the one-minute nonintrusive period. The minute was divided into four 15-second coding periods. Movement toward or away from the stranger was coded in four categories for each of the 15-second periods: 1) movement away from the stranger; 2) no movement either towards or away; 3) movement towards the stranger; and 4) movement away and movement towards the stranger within the 15-second period. Intercoder agreement, based upon the judgements of a coder who considered all 87 cases, and a second coder who viewed 45 of the cases, was 92%.

Facial expression coding was performed separately for expressions directed to the stranger and those to the mother. In each 15-second period, the infant's facial expression was classified using the following set of categories: 1) cry or whimper face; 2) negative but not cry or whimper face; 3) neutral; 4) positive but not smile; 5) smile; and 6) did not look at stranger/mother. A simplified classification was formed: 1) cry or whimper face; 2) neither cry/whimper nor smile; 3) smile; and 4) did not look at the stranger/mother. Intercoder agreement was 92% for expressions to the stranger and 97% for those to the mother.

The infant's proximity to the mother was coded dichotomously: 1) infant is near the mother or moves towards her; and 2) infant is not near the mother and does not move towards her. Intercoder agreement was 91%. Toy offer was coded for offers to the stranger and offers to the mother separately: 1) offers the toy to the stranger/mother; and 2) does not offer the toy to the stranger/mother. Intercoder agreement was 99% for offers to the stranger and 100% for offers to the mother.